REMARKS

In the Office Action dated December 3, 2001, the Examiner objected to the drawings under 37 C.F.R. §1.84(p)(5) because the Examiner stated they do not include a designation of the air gap in Figure 1. In fact, the air gap 21 is not visible in Figure 1, and therefore the first reference thereto at page 8, line 20 has been revised to make clear that the air gap 21 is shown in Figure 2. No amendment on the drawing on this point therefore is necessary.

The drawings also were objected to as failing to comply with 37 C.F.R. §1.84(p)(4) because the Examiner stated the reference characters 20 and 24 have been used to designate both air gaps and annular guide devices in Figures 1 and 2. Applicants and their counsel have reviewed Figures 1 and 2 and the written description, but are unable to find any instance where either reference numeral 20 or 24 is used to designate an air gap. The only location in the written portion of the specification wherein these reference numerals are mentioned is at page 10, lines 14-17, and this passage makes no reference to an air gap. Moreover, the components designated with the reference numerals 20 and 24 in Figure 1 are consistent with this description in the written portion of the specification, and consistent with the designation of those components in Figure 2. If the Examiner can provide further explanation to substantiate the Examiner's belief that reference numerals 20 and 24 have been used to designate both air gaps and annular guide devices, Applicants will reconsider this point, however, at the moment no amendment to the drawings is seen to be necessary.

Claims 6 and 14 were rejected under §112, second paragraph, as being indefinite, and the Examiner provided suggested language to overcome this rejection. Claims 6 and 14 have been editorially revised consistent with the Examiner's

suggestion, and are therefore submitted to be in full compliance with all provisions of §112.

Claim 1-4, 7-10, 12, 15, 17 and 18 were rejected under 35 U.S.C. §102(b) as being anticipated by Deucher et al. Claims 5, 11 and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Deucher et al. Claims 6 and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Deucher et al., further in view of Sribar et al. Claim 16 was stated to be allowable if rewritten in independent form.

By the present Amendment, claim 1 has been amended by bringing the subject matter of claim 5 therein, and claim 5 accordingly has been cancelled. A similar amendment has been made to independent claim 17. Claim 8 has been combined with claim 9 and rewritten in independent form, and claim 9 accordingly has been cancelled. New independent claim 20 has been added which is directed to computed tomography apparatus having the heat exchanger arrangement set forth in (now) independent claim 8. Claims 19 and 21 have been added, respectively depending from claims 17 and 20, which correspond to the allowable subject matter of claim 16.

The amended independent claims and the claims respectively depending therefrom, and new independent claim 20 and the claim depending therefrom, are respectfully submitted to be patentable over the teachings of the references relied upon by the Examiner for the following reasons.

As to independent claims 1 and 17, the Deucher et al. reference discloses a cooling device for a computed tomography apparatus having two closed cooling circulation paths which are thermally connected by a heat exchanger. These cooling circulation paths are arranged at a rotating gantry C of a computed tomography apparatus. The first cooling circulation path is connected to the housing of the X-ray

radiator, so that coolant can flow through this housing. For heat elimination of the heat that is stored in the coolant in the first cooling circulation path, after transfer from the X-ray radiator, the first cooling circulation path is in thermal communication with the second cooling circulation path by means of a heat exchanger 34. The heat exchanger 34 of the first cooling circulation path, however, is not arranged in the form of a ring at the rotating part of the gantry C. As can be seen from Figure 2 of Deucher et al., there is no space for a further heat exchanger on the rotating gantry C, and therefore a person of ordinary skill in the art would have no inducement or motivation to modify the first cooling circulation path to provide it with a number of heat exchange elements arranged in the manner of a ring.

The second cooling circulation path in the Deucher et al. reference is arranged around the rotating gantry C. The heat stored in the second cooling circulation path, which employs water as a coolant, is transferred from the water to ambient air surrounding the computed tomography apparatus by means of a further heat exchanger 48. This heat exchanger 48 is in the shape of a circular cooler, as described at column 5, lines 1-23. In order to improve the heat transfer of the heat exchanger 48 to the ambient air, the heat exchanger 48 is provided with radially directed plates in order to conduct heated air away from the heat exchanger 48, as described at column 4, line 48 through column 5, line 23 of the Deucher et al. reference. The Deucher et al. reference does not teach or suggest that the second heat exchanger 48 be implemented in any manner other than the circular structure disclosed in that reference. Thus the Deucher et al. reference does not disclose or suggest to employ a number of heat exchange elements connected to each other in a ring-like manner for the second heat exchanger

48. Such heat exchange elements can be economically manufactured, since they are commercially available in the automotive industry.

Therefore, the Deucher et al. reference does not disclose or suggest the subject matter of independent claims 1 or 17. The respective dependent claims depending from those independent claims add further structure to the novel and non-obvious combinations of those independent claims, and are therefore patentable for the same reasons discussed above in connection with the independent claims.

As to independent claims 8 and 20, both cooling circulation paths in the computed tomography apparatus disclosed in Deucher et al. rotate with the gantry during operation of the gantry. The second cooling circulation path arranged around the gantry in the Deucher et al. structure merely emits heat from its coolant to the ambient air. Deucher et al. discloses only that the ambient air in the room, which becomes elevated in temperature as a result, can be circulated out of the room via air shafts arranged at the ceiling of the room, as described at column 5, lines 1-23. Consequently, the Deucher et al. reference does not provide any teachings to those of ordinary skill in the art to augment the cooling arrangement disclosed in Deucher et al. with a further cooling circulation path for improved cooling, this further cooling circulation path being stationary relative to the first cooling circulation path, as set forth in independent claims 8 and 20.

The dependent claims respectively depending from claims 8 and 20 add further structure to the novel and non-obvious combinations of those independent claims, and are therefore patentable as well for the same reasons.

All claims of the application are therefore submitted to be in condition for allowance, and early reconsideration of the application is respectfully requested.

Submitted by,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

Please amend the paragraph beginning at page 8, line 17 as follows:

In the exemplary embodiment, a second heat exchanger 13 that interacts with the first heat exchanger 9 and that is likewise fashioned ring-like is arranged around the first heat exchanger 9. The heat exchanger 13 is stationary relative to the heat exchanger 9. An air gap 21 (see Figure 2) is present between the two heat exchangers 9 and 13. Like the heat exchanger 9, the heat exchanger 13 in the exemplary embodiment also is formed of seven annularly arranged heat exchange elements 14 in which a medium flows, that are connected to one another via hose conduits 15, so that the medium can circulate through the heat exchange elements 14.

IN THE CLAIMS

Please amend claim 1 as follows:

1. (Amended) In an X-ray examination arrangement having an X-ray source mounted at a gantry which is rotatable around a [rotatable] rotational axis, the improvement of a cooling arrangement for said X-ray source comprising:

a ring-like heat exchanger disposed at said gantry [and in] having at least two heat exchange elements thermally conductively connected to each other, with at least one of said heat exchange elements being thermally [conductive connection] conductively connected with said X-ray source.

Please amend claim 6 as follows:

6. (Amended) The improvement of claim [5] 1, further comprising a [circumferential] covering proceeding circumferentially around said rotational axis and disposed between said at least two heat exchange elements.

Please amend claim 8 as follows:

8. (Amended) [The improvement of claim 1, wherein said heat exchanger is] In an X-ray examination arrangement having an X-ray source mounted at a gantry which is rotatable around a rotational axis, the improvement of a cooling arrangement for said X-ray source comprising:

a first ring-like heat exchanger[, and further comprising] disposed at said gantry and in thermally conductive connection with said X-ray source; and

a second ring-like heat exchanger disposed in a thermally conductive path with said first heat exchanger, with said first heat exchanger transferring heat from said X-ray source to said second heat exchanger, said second heat exchanger being stationary relative to said first heat exchanger.

Please amend claim 14 as follows:

14. (Amended) The improvement of claim 13, further comprising [circumferential coverings] a covering proceeding circumferentially around said rotational axis and disposed between said at least two heat exchange elements of said second heat exchanger.

Please amend claim 17 as follows:

17. (Amended) A computed tomography apparatus comprising:

a gantry rotatable around a rotational axis;

an X-ray source and an X-ray detector mounted opposite to each other on said gantry, said X-ray source emitting heat during operation thereof; and

a ring-like heat exchanger disposed at said gantry [and] <u>having at least two heat exchange elements thermally conductively connected to each other, with at least one of said heat exchange elements being</u> thermally conductively connected to said X-ray source for transferring said heat from said X-ray source.